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DOES FINANCIAL DEVELOPMENT PROMOTE ECONOMIC GROWTH? EVIDENCE FROM SELECTED CIS COUNTRIES

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This paper examines whether financial development stimulates economic growth in the case of selected Commonwealth of Independent States (CIS) countries. Methodologically, the paper uses panel data taking advantage of cross-country and time-series dimensions. As an econometrical approach, the Generalized Method of Moments (GMM) dynamic panel estimation is used in the 'Stata' application. The research results showed that financial development exerts a positive and important impact on economic growth in the case of selected countries.

Key Words: economic development, economic growth, CIS, GMM, positive

MOLIYAVIY RIVOJLANISH IQTISODIY O'SISHGA YORDAM BERADIMI? TANLANGAN MDH MAMLAKATLARIDAN OLINGAN DALILLAR

Ushbu hujjat tanlangan Mustaqil Davlatlar Hamdo‘stligi (MDH) mamlakatlarida moliyaviy rivojlanish iqtisodiy o‘sishni rag‘batlantiradimi yoki yo‘qligini ko‘rib chiqadi. Metodologik jihatdan, maqola davlatlar kesimi va vaqt seriyalari o‘lchamlarini hisobga olgan holda panel ma’lumotlaridan foydalanadi. Ekonometrik yondashuv sifatida, ‘Stata’ programmasi yordamida Umumlashtiruvchi Momentlar Usuli (GMM) dinamik panelni baholashdan foydalaniladi. Tadqiqot natijalari shuni ko‘rsatdiki, tanlangan mamlakatlarning moliyaviy rivojlanishi ijobiy va iqtisodiy o‘sishga muhim ta’sir ko‘rsatadi.

Kalit so‘zlar: iqtisodiy rivojlanish, iqtisodiy o‘sish, MDH, GMM, ijobiy

СПОСОБСТВУЕТ ЛИ ФИНАНСОВОЕ РАЗВИТИЕ ЭКОНОМИЧЕСКОМУ РОСТУ? ДАННЫЕ ИЗ ОТДЕЛЬНЫХ СТРАН СНГ

В данной статье рассматривается вопрос о том, стимулирует ли финансовое развитие экономический рост в отдельных странах Содружества Независимых Государств (СНГ). С методологической точки зрения, в статье используются данные, используемые для измерения по пересеченной местности и временным рядам. В качестве эконометрического подхода в приложении «Stata» используется динамическая панельная оценка Обобщенного метода моментов (GMM). Результаты исследования показали, что финансовое развитие оказывает положительное и важное влияние на экономический рост в случае отдельных стран.

Ключевые слова: финансы, развитие, экономика, рост, СНГ, GMM, позитив

INTRODUCTION

In economics it has been long debated that economic growth is a particularly complex process and it relies on many variables such as labor, human and physical capital accumulation, foreign trade, income distribution, political stability, and so on. Specifically, in theoretical and empirical literature it is argued that one of such major components of economic growth is financial development. Generally, financial development is measured by the depth, size, stability, and efficiency of financial systems that include effectively operating markets, intermediaries, institutions, and regulations. Similarly, economic growth is an increase in the economic capacity to produce goods and services from one period of time to another (Mankiw, 2004) [1]. Put it simply, it is a growth of specific indices such as per capita income, national income, and gross domestic product (GDP). As many of the papers imply that financial deepening positively affects the growth of an economy, the following work will test whether it is true for the case of selected CIS countries employing such a research question as "Does financial development promote economic growth?". Hence, the aim of the paper is a crucial concern as it provides some guidance on whether financial deepening is a necessary and sufficient condition for higher growth rates in CIS countries. Further, it helps to evaluate the extent to which finance should be developed so that to achieve higher economic growth in developing countries.

LITERATURE REVIEW

The relationship between financial development and economic growth has gained generous attention in both theoretical and empirical literature, and it has been a crucial subject ever since. Internationally, this relationship has involved the minds of economists from Smith to Schumpeter. Numerous firm-level, industry-level, cross-country, and many other studies have been conducted from the earliest times till today to investigate the link between financial development and economic growth, and each of the work has achieved suggestive results for certain periods in different countries. Nevertheless, the direction of causality has remained undetermined both in theory and empirics. Not all the researchers had the same idea about the channels of causality. Overall, several contrasting points of views have been obtained. In general, according to Graff (2003) [2] and Kiran et al (2009) [3], there are four possible attitudes regarding the causal relationship between financial development and economic growth:

Financial development causes economic growth: Financial development is a determinant of economic growth, which means that the line of causality runs from financial development to economic growth. This causation is termed by Patrick (1966) [4] as "supply-leading", which means that the availability of financial institutions increase the demand for services, and thus, leads to a growing economy. Directly, it means that while specific factors cause financial development, in turn, it generates higher levels of economic activity. Such belief traces its origins back to Schumpeter, and was broadly demonstrated by a huge number of scholarly literature that has used extensive historical evidence on cross-country and within-country analysis. By employing endogenous

growth theory, Bencivenga and Smith (1991) [5] explained that in fact, financial development stimulates the savings behavior. As a result, the rising savings rate has an impact on not only income levels but also growth levels. Since financial development can have an intense effect on real economic activity, it does so on economic growth too. Furthermore, it was also confirmed that when financial overturn is avoided and systems are liberalized, there will be a base for a financial deepening and then economies will grow. The same idea has been accompanied by Hicks (1969) [6]. However, arguments differ but still Schumpeterian and some Neo-Keynesian economists usually emphasize that it is the banking system's power that influences the economies to grow. Turning to empirical evidence, a large number of economists have shown that finance promotes growth by econometrical models. From the earlier studies, Patrick (1966) has established that there is a positive linkage between financial development and growth in Europe, Russia, Japan, and the US, Mexico, Brazil, respectively. Later on, Levine and King (1993) [7] have also found a robust relationship between financial development and economic growth. They have taken the financial depth, liquid liabilities, bank, and private credits as the four financial development indicators. The GDP per capita growth rates, capital accumulation, and productivity rates were used as the three economic growth indices. Their cross-section regression analysis for 77 countries for the period 1960-1989 suggests that all the financial indicators were largely correlated with growth indices, which made a clear statement that financial development was strongly and positively correlated with economic growth. Moreover, Levine and Zervos (1996) [8] using data on 49 countries from 1976 to 1993 concluded that stock market liquidity as a financial development index is significantly associated with current and future levels of economic growth. Likewise, Rajan and Zingales (1998) [9] used data of 1980-1990 for the United States and proposed that financial sector development can be an important determinant in an industrialized growth of the economy. Besides, Levine, Loayza, and Beck (2000) [10] also found a strong and economically significant impact of financial expansion on economic growth using a dynamic Generalized Method of Moments (GMM) for panel data on 71 countries during 1960-1995. Furthermore, Levine, Beck, Demirguc-Kunt, and Maksimovic (2000) [11] also added their contribution to a long-debated issue stressing that there is a strong nexus between finance and growth. They used three methodologies to prove their proposal. First, they took cross-country level analysis using modified OLS and Instrument Variable (IV) estimations for 48 countries within 1980-1995. Second, they provided industry-level analysis, in which they continued the methodology of Rajan and Zingales (1998) and used a panel data from 34 countries and 36 industries. Finally, they explored a firm-level analysis using 33 countries between 1990-1995, where they followed the approach of Demirguc-Kunt and Maksimovich (1998).

Economic growth causes financial development: Financial development follows economic growth, which means that economic growth causes the development of financial systems. Patrick (1966) explained this as a "demand-following" view, meaning that demand for financial services depends on the growth of the economy. Thus, the

higher the level of the economy, the higher will be the demand for financial services, which leads to a rise in the development of financial systems. In contrast with the supply-leading hypothesis, many economists have asserted that the growth of the world economy has usually been leading to higher levels of financial development. For instance, the idea that economic growth causes financial development was seriously seen by Demetriades and Hussein (1996) [12]. They have also stated very similar reasoning, that is, financial development is caused by the long-run economic growth while considering the real growth, and that an expansion of financial systems is only an outcome of the demand for the increase of real economic activities.

On the empirical side, Kar and Pentecost (2000) [13] supported such a demand-following view. They have tested the direction of the causality between financial development and economic growth using the Granger causality test and the Vector Error Correction Model (VECM) for Turkey during 1963-1995. They chose bank deposits and private credit as the proxies for financial development, and their results suggested that growth appeared to lead the financial sector development. Moreover, Jacques (2010) [14] while analyzing the nexus between financial development and growth, discovered that economic growth causes financial development in Burkina Faso, Cote d'Ivoire, and Sierra Leone during the period 1960-2005 using Augmented Dickey-Fuller (ADF) to test for stationarity and Johansen Cointegration test.

Bi-directional causality: The cases of supply-leading and demand-following views are seen as a unidirectional causality as because whether finance causes growth and growth have no impact on the former, or vice versa - growth leads to financial development but not the latter causes the former. However, when finance and growth have an impact on each other, it can be said that they follow bi-directional causality, or feedback, as known in vast finance and economics literature. In theory, Lewis (1955) [15], as one of the 'pioneers' of development economics, has proposed such a two-way nexus between financial development and growth. To understand such a relationship, he gives an important note that the real terms of economic growth should also be considered. In short, as he postulates, such causation assumes that development in the financial markets is the result of an increase and growth in economic activity, which sequentially feeds back as an encouragement to the real economic growth.

Several empirical studies have presented such bi-directional causality between financial development and growth of an economy. For instance, Murinde and Eng (1994) [16] asserted that several endogenous growth models exhibit such a two-way causal relationship between financial development and economic growth. They have explained that the direction of the causality between the two is reactive to the selection of the proxy used for financial development. For example, when financial development is determined by the money to income ratio, the direction of causality goes from financial development to economic growth. However, when the bank deposits, private credit, and domestic credit ratios are taken as the proxy for financial development, economic growth is considered to lead financial development (Kar and Pentecost, 2000). Likewise, Liu and Shu (2002) [17] used quarterly data from 1983 till 1997 for China and found bi-

directional causality between financial deepening and growth with time-series analysis. They employed the Granger causality test within the VECM framework and concluded that economic growth and financial development are mutually interdependent.

No relationship between the two: Financial development and economic growth are not causally related. That is, they have no impact on each other, and that the empirically established relation between them is the outcome of a historical peculiarity. Economies rose and so did the financial systems but following their reasons. Contrary to the views of Schumpeter and other scholars that emphasize the prominent role of finance on growth, some opponents such as Robinson (1952) [18] claim that finance does not influence economic growth, nor growth promotes financial development. Moreover, Nobel Laureates Merton Miller and Robert Lucas highlight that financial development is evidently inessential and they do not even mention it when referring to the determinants of economic growth. Besides, as new era economists, Andersen and Tarp (2003) [19] criticize the traditional models regarding the finance-growth nexus that they do not take into account the insights of the modern informational economics. The main explanations they give are such that due to asymmetric information, markets can be a constraint in Pareto inefficiency, and thus any expansion in the banking sector competition will not necessarily lead to an increase in financial sector development, but an unstable financial environment. In such a case, not financial development, but rather more substantial and affective factors will influence the growth engine.

In the empirical literature, De Gregorio and Guidotti (1995) [20] researched the finance-growth linkage and found that high rates of the ratios of bank credit to GDP in Latin America between 1970 and 1980 had no impact on its economic growth. As they believe, this outcome was attributed because of the poor regulation systems and deposit insurance policies of that period, which caused over-expansion in credits and banking crises. Likewise, Ranciere and Loayza (2004) [21] also found a zero correlation between temporary changes in growth and bank credit in those countries that demonstrated high rates of financial fragility and liberalization. However, they expected that such volatilities would have a considerable effect on long-term economic growth. Applying a model generated by Levine in 1997, Al-Zubi et al (2006) [22] also tested the nexus between finance and growth. They employed panel data on the period 1980-2001 for 11 Arab economies. Their results suggested that financial development indices are statistically insignificant and do not have any impact the economic growth, and growth does not cause finance either. The previous and existing theoretical and empirical pieces of evidence do not exclude any of the possibilities regarding the relationship between financial development and economic growth. Thus, there is a need for further research.

METHODOLOGY

Data

Only secondary data is used for econometric modeling and estimation analysis. All the data is obtained from World Bank Development Indicators for the period 1992-2010.

Due to some missing points, it is referred as unbalanced data and is collected for 9 CIS countries such as Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Russia, and Ukraine[1] basing on the data availability.

A Measure of Financial Development

In the related literature, several types of measures have been used as proxies for financial development. Liquid liabilities, domestic, private and bank credits, stock market liquidity and commonly their ratios to GDP were the main measures used by several research papers of Levine and Zervos (1996), Levine and King (2003), Levine, Loayza and Beck (2000) – (further LLB), Kar and Pentecost (2000), Kiran, Yavuz and Guris (2009) and so on. However, it has been widely emphasized that among those measures liquid liabilities are the most extensive and the most used variable. Levine et al (LLB, 2000) employed the measure of liquid liabilities as currency plus and interest and demand liabilities of the bank and nonbank financial institutions divided by GDP (times 100). In the same way, Kiran, Yavuz, and Guris (2009) also used the measure of liquid liabilities that was obtained as the ratio of broad money to GDP (times 100). Interestingly, Kar and Pentecost (2000) called this measure as money to income ratio. Following the same way, in the current paper money to income ratio was used as a financial development indicator, which is the ratio of broad money to nominal GDP times 100.

Other factors that affect growth

Solow (1956) has made a huge contribution to the theory and empirics of economic growth. He has proposed that basically growth is a function of labor and capital through the savings behavior while taking into account the technological progress as well. Building on the traditional Solow model, Mankiw, Romer, and Weil (1992) [23], while confirming the Solow model's consistency with evidence, have argued that the model does not correctly predict the magnitudes. Thus, they have developed the Augmented Solow model where they included human capital as the other important factor. Their empirical results support the Augmented Solow model and show that adding human capital improves the performance of the model. Therefore, basing on this strong evidence, labor, physical and human capital are also added to the regression model as the other main factors to measure economic growth in the empirical part of this paper. The labor participation rate is taken as a proxy for labor, whereas gross fixed capital formation (annual growth) and tertiary school enrollment (% gross) are chosen as physical and human capital, respectively.

Model and the Estimation Technique

The basic regression model for panel data estimation is given in the following log-lin form:

[1] Ukraine has been an essential part of CIS though not an official member.

$$\mathbf{LnYpp_{i,t} = \beta_1 M/Y_{i,t} + \beta_2 LP_{i,t} + \beta_3 I_{i,t} + \beta_4 TSE_{i,t} + \eta_i + u_{i,t}}$$

where:

- LnYpp - the logarithm of real GDP per capita: the ratio of nominal GDP to the Consumer Price Index was divided by the percentage of the working-age population, logarithm form is taken
- M/Y - money to income ratio: the ratio of broad money to nominal GDP and times 100
- LP - labor participation rate (total)
- I - gross fixed capital formation (annual growth)
- TSE - school enrollment, tertiary (% gross)

The betas of the model are the coefficients of the regressors, and η is an unobserved country-specific effect whereas u is the error term. i ranges for countries while t for time (years).

It has been indicated in the literature that any measurement error, correlated error terms, omitted variable bias, and the relationship between independent variables and the error term are the main sources of endogeneity. In our case, in the model given above, the right-hand-side variable and the left-hand-side variable are correlated, that is, the log of real GDP per capita and the money to income ratio are not free from influence on each other. Such a condition is known as reverse causality and is one of the types of endogeneity. The existence of such type of endogeneity violates one of the assumptions of ordinary least squares (OLS) for best linear unbiased estimator (BLUE), as a result, the OLS method gives biased estimators. Therefore, to control this endogeneity and achieve unbiased and consistent estimators the Generalized Method of Moments (GMM) is employed. This method estimators were first introduced by Holtz-Eakin, Newey and Rosen (1990), Arellano and Bond (1991) [24], Arellano and Bover (1995) [25], and Blundell and Bond (1998) [26]. The biggest advantage of GMM is that it can control for above-mentioned endogeneity problem. Furthermore, it also manages unobserved country-specific effects and biases associated with the cross-sectional estimators. Besides, this method allows us to include the lagged dependent variables as a regressor. On the other hand, according to Monte Carlo experiments, one of the shortcomings of this method is that the weakness of applied instruments may produce biased coefficients in small samples. Thus, for GMM estimation sufficient instruments are required and the consistency of the estimators depends on the validity of the instruments. For the given model, three types of GMM estimations are carried out - difference GMM, system GMM, and the extension of both. However, before proceeding to the estimations there is a need to implement panel unit root tests in order to see whether system GMM estimators are consistent or not.

Panel Data Unit Root Tests

Typically, there are several unit root tests for panel datasets such as Levin-Lin-Chu (LLC), Harris-Tzavalis (HT), Breitung, Im-Pesaran-Shin (IPS), Fisher-type (FT) and

Hadri Lagrange multiplier (LM) stationarity tests. All the tests except LM have the null hypothesis that all the panels have a unit root, whereas the LM test's null hypothesis is that all the panels are stationary. However, only IPS and FT tests can be applied when the data is unbalanced. The difference between the two is that FT conducts stationarity tests for each panel individually and combines the p-values to produce the overall result. To make comparisons and increase the reliability of results both IPS and FT are used to test for unit roots.

GMM Techniques

The dynamic panel data estimation has increasingly been popular in the recent empirical works, specifically the models by Arellano and Bond (1991) and later by Arellano and Bover (1995) and Blundell and Bond (1998). These are the general estimators which possess the following features:

✓ Lagged dependent variable enters the model as a regressor

✓ Not strictly exogenous independent variables, meaning that they are correlated with past and current error terms

✓ Fixed effects

✓ Heteroscedasticity and autocorrelation within countries but not across them

Methodologically, the first step was to carry out the Arellano-Bond (AB)[2] dynamic panel data estimation. It starts by transforming all the explanatory variables by differencing and is sometimes called 'difference GMM'. The difference GMM assumes that though the error term itself is correlated with the regressors, the differences of it are not. Hence, difference GMM takes the difference of the error term as the instruments for itself:

$$E\left[Y_{i,\,t-s}\left(u_{i,t}-u_{i,t-1}\right)\right]=0 \qquad E\left[X_{i,t-s}\left(u_{i,t}-u_{i,t-1}\right)\right]=0 \qquad \text{for} \quad s>2;\ t=3,\ldots,n$$

Thus, the given moment conditions imply that the differences in the error term are not correlated with the variables. Moreover, differencing gives a condition to get rid of the unobserved country-specific effect. However, there are some shortcomings to this difference estimator. First of all, we would certainly like to study the cross-country relationship between financial development and economic growth, which is eliminated in the difference estimator. Therefore, Arellano and Bover (1995) and Blundell and Bond (1998) - (further ABBB) have shown that when the explanatory variables are persistent over time, lagged levels make weak instruments for the regression in differences, and instrument's weakness influences small sample performance of the difference estimator. Thus, the variance of the coefficients rises. As a result, in small samples, weak instruments can bias the coefficients, as can be the case for my sample. Therefore, to reduce such potential biases and imprecision associated with the difference estimator, ABBB has augmented the usual AB model and referred to it as 'system

[2] Note: Arellano-Bond dynamic panel estimation - difference GMM
Arellano-Bover/Blundell-Bond dynamic panel estimation - system GMM

GMM', which allows the introduction of more instruments and can improve the efficiency in most cases. Specifically, system GMM combines in a system the regression in difference (as does difference GMM) plus the regression in levels. The instruments for regression in difference were the same as explained earlier, and the instruments for regression in levels were set as following:

$$E\left[(Y_{i,\,t-s} - Y_{i,t-s-1})(\eta_i + u_{i,t})\right] = 0 \qquad E\left[(X_{i,t-s} - X_{i,t-s-1})(\eta_i + u_{i,t})\right] = 0 \qquad \text{for} \quad s=1$$

These moment conditions show that the lagged difference of the variables is not correlated to the country-specific effect and the error term. These can be proper instruments under the assumption that though there is a correlation between levels of regressors and residuals, there is no correlation between their lagged differences. However, this assumption only relies on the stationarity property because it includes regression in levels as well. If any panel has a unit root problem then this system GMM may not give consistent estimators.

On the other hand, most recently established command of Stata statistical software package, so-called ‘xtabond2’ can implement both the difference and system GMM and has several advantages over those estimation tools[3]. It is usually referred to as 'one-step difference GMM'. It was pedagogically introduced by Roodman (2006) and its finite-sample correction for the two-step covariance matrix was derived by Windmeijer (2005). One disadvantage of both difference and system GMM is that they are relatively complex and may easily produce invalid estimates. Moreover, running them in the Stata command puts a risk that users not understanding the purpose, design, and limitations of the models may unknowingly misemploy them. However, one-step difference GMM, while keeping all the advantages of both difference and system GMM, provides manageable estimation with more efficient and consistent estimators. Besides, it automatically generates additional tests such as the Arellano-Bond test for autocorrelation and Sargan test for over-identifying restrictions. The autocorrelation test examines the hypothesis that the error term ($u_{i,t}$) is not serially correlated. Usually, the differenced error term likely has the first-order autocorrelation even if the original error term is not. The test hypotheses are given as:

Ho: Residuals are not serially correlated (there is no autocorrelation)

Ha: Residuals are serially correlated (there is autocorrelation)

The second Sargan test investigates the overall validity of the instruments used, that is, whether the instruments used in the moment conditions are valid or not. The Null and the Alternative hypotheses of the test are:

Ho: Instruments are valid

Ha: Instruments are not valid (the model is weakened by many instruments)

[3] xtabond2 is not an official Stata command, but it is a free distribution and was downloaded for free.

Failure to reject the Null hypotheses of both autocorrelation and Sargan tests encourages the model. Hence, though the superiority of xtabond2 is realized in generating unbiased, consistent, and efficient estimators, analysis for the other two GMM methods, unit root tests, and a simple Fixed Effects regression are also carried out for comparative purposes. The results of the regressions and tests, comparisons, and interpretations are discussed in the following section.

RESULTS[4]

All the regressions, tests, graphs were carried out in the Stata software package. Before proceeding to any estimations, the very first step was to produce the summary statistics of the chosen variables, which is provided in the following Table 1:

Table 1: The Summary Statistics

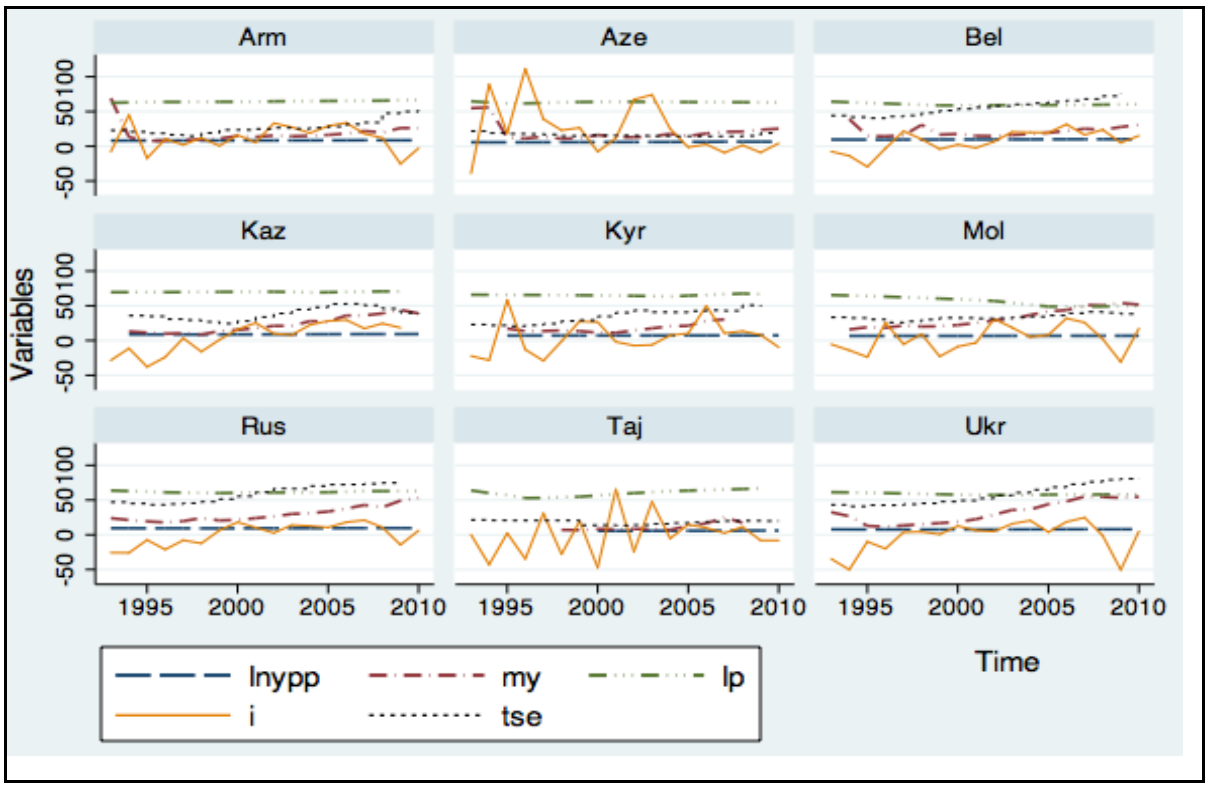
Variable	Obs	Mean	Std. Dev.	Min	Max
lnypp	151	7.8726	1.358045	5.518846	10.14823
my	147	23.61234	13.2961	6.723815	69.11378
lp	159	62.16604	4.679133	48.9	70.8
i	161	6.114094	24.46779	-50.5	111.4
tse	155	38.31897	18.23032	13.34779	80.6051

The table shows that because the data is unbalanced the number of observations for each variable differs. The mean represents the averages of the variable values, whereas the standard deviation embodies the deviations from the mean values. The highest standard deviation of 24.47 implies that investment annual growth rates (of selected countries for the chosen period) have been fluctuating around its mean in both directions more than other variables.

Furthermore, a visual plot is usually the first step in the analysis of the data. Graph 1 below demonstrates the selected variables' movements during the chosen period. Note that due to unbalanced data there might be few missing points in the illustration. Such a graph can also be a good tool in looking for stationarity before starting any unit root test. Stationary is met when the mean and variance of a series do not change systematically over time, that is when the series does not move with time.

Graph 1: Variable Movements during 1992-2010

[4] All results are achieved by the Author in 'Stata' application



Source: Prepared by the Author

It can be observed that among other variables investment growth was relatively the most volatile in each of the countries. Usually, such remarkable fluctuations inform that the series is stationary because it does not follow any pattern along with time. In contrast, we can also notice that the log of real GDP per capita has been almost constant throughout the period. Interestingly, such stability can also be a sign of stationarity because again, it does not vary with time. However, the rest of the variables seem to have certain trends, which may inform them that they might have a unit root problem. Nevertheless, such judgments are too weak, so only the unit root test results can provide the correct decision.

Panel Unit Root test results

The results of IPS and FT unit root tests for all panel variables are provided in the Appendix. To remind, the hypothesis of both tests were the same as followings:

Ho: All the panels have a unit root
Ha: Some panels are stationary

It can be seen from the outcome that both tests yielded the same results. First, let us pay attention to the results of the log of real GDP per capita. For this panel, the probability of the z-statistic computed by IPS is equal to 0.06, whereas the probability of the statistic calculated by FT basing on Augmented Dickey-Fuller is 0.0223. Thus, at 10% significance level, because p-values are less than 10%, we can reject the null hypothesis

and conclude that this panel is stationary. In the same way, the p-values of the statistics produced by IPS and FT for money to income ratio and investment growth are also less than the given significance level, again leading to a decision that those two panels are also stationary. However, for labor participation rate and tertiary school enrollment the IPS generated p-values are 0.8661 and 0.9997, whereas FT produced 0.6000 and 0.9988, respectively. So in this case, we fail to reject the null hypothesis because of such high p-values, and it means that those panels have unit root problems. In overall, both tests demonstrate that LNYPP, I, M/Y panels are stationary, however, LP and TSE panels are non-stationary. Hence, the existence of non-stationarity in any of the panels might lead to the system GMM estimation results.

FE and GMM estimation results

The main aim of employing FE regression is to show the existence of endogeneity in the model. According to the estimation output the correlation between the error term and the explanatory variables is 0.62, which is high enough to suggest that a particular independent variable has entered the model endogenously. This is another type of endogeneity that arises from the correlation between the explanatory variable and the residual. Moreover, it was the first introductory step to view the potential estimation outcome and to have an idea of what might the estimators be like.

Table 2: Fixed Effects estimation results

Fixed-effects (within) regression — Number of obs = **142**
Group variable: **cntr_id** — Number of groups = **9**
Time variable: **year**

Obs per group: min = **9**
avg = **15.8**
Max = **18**

R-sq: within = **0.4061**
between = **0.6840**
overall = **0.5122**

F(4,129) = 22.05
Prob > F = **0.0000**

corr(u_i, Xb) = **0.6269**

lnypp	Coef.	Std. Err.	z	P>[z]	[95% Conf.	Interval]
my	**.0010948**	**.0013628**	**0.80**	**0.423**	**-.0016015**	**.0037912**
lp	**.0090228**	**.0054092**	**1.67**	**0.098**	**-.0016794**	**.019725**
i	**-.0007918**	**.0005404**	**-1.47**	**0.145**	**-.001861**	**.0002775**
tse	**.0115151**	**.0016117**	**7.14**	**0.000**	**.0083264**	**.0147038**
_cons	**6.827692**	**.3459071**	**19.74**	**0.000**	**6.143306**	**7.512078**
sigma_u	**1.3008928**					
sigma_e	**.14494806**					
rho	**.98773738**	(fraction of variance due to u_i)				

F test that all u_i=0: F(8,129) = **570.87** Prob > F = **0.0000**

According to Gujarati (2004) [27], in semilog models like Log-Lin[5] in our case, the computed coefficients must be multiplied by 100 to find the actual impact of a regressor on a regressand. But note that this rule does not apply for the constant term. From the table it can be observed that at the given 5% significance level, only the coefficients of TSE and the intercept seem to be statistically significant as shown by 7.14 and 19.74 t-statistics, respectively. In this case, the TSE coefficient of 0.01151 would mean that 1% increase in TSE rises LNYPP by approximately 1.15%. Moreover, the parameter of the constant would imply that if all the coefficient of regressors were zero, LNYPP would grow at about 6.82%. In contrast, the t-statistics of other coefficients show that they are insignificant, meaning that they are not statistically different from zero. Thus, because of these conditions we just fail to provide any interpretation for the estimators. However, note that the above statements are just potential interpretations and do not provide any actual information because those estimators are not BLUE in this estimation due to the problems that were discussed earlier.

Now, turn to the GMM estimation results. The following Table 3 represents the output of difference GMM regression:

Table 3: Difference GMM estimation results

Arellano-Bond dynamic panel-data estimation				Number of obs = **125**		
Group variable: **cntr_id**				Number of groups = **9**		
Time variable: **year**				Obs per group: min = **7**		
				avg = **13.8889**		
				Max = **16**		
Number of instruments = **124**						
				Wald chi2(4) = **115.28**		
Two-step results				Prob > chi2 = **0.0000**		
				Std. Err. adjusted on cntr_id		
lnypp	Coef.	WC-Robust Std. Err.	z	P>[z]	[95% Conf.	Interval]
lnypp L1.	**1.024969**	**1.794675**	**0.57**	**0.568**	**-2.49253**	**4.542467**
my	**-.0022196**	**.0175352**	**-0.13**	**0.899**	**-.036588**	**.0321487**
lp	**.016498**	**.2910736**	**0.06**	**0.955**	**-.5539958**	**.5869918**
i	**.0003716**	**.0008135**	**0.46**	**0.648**	**-.0012229**	**.001966**
tse	**-.0056585**	**.0164678**	**-0.34**	**0.731**	**-.0379348**	**.0266178**
Instruments for first differences equation						
GMM-type: L(2/.).lnypp L(1/.).my						

[5] Because the regressand is in logarithmic form, whereas the regressors are linear in parameters.

Note that the instruments used are shown in the below section of the table as they were explained in the methodology part. Although the difference GMM does not provide Sargan test for overidentifying restrictions, it can be observed that the estimated model was heavily weakened by many instruments. It becomes clear when we compare the number of observations with the number of instruments used, which is 125 and 124, respectively. Moreover, given the z-statistics for each of the variables, all the computed estimators are statistically insignificant, meaning that at 5% significance level the coefficients are not statistically different from zero. Therefore, based on this situation we fail to give any interpretation about the effect of any independent variable on the dependent variable. Thus, even though there is a negative coefficient of M/Y, we cannot assure that this financial development index negatively affects economic growth. The same applies for the given coefficient of TSE.

The following Table 4 provides the outcome of system GMM estimation:

Table 4: System GMM estimation results

System dynamic panel-data estimation				Number of obs = **134**		
Group variable: **cntr_id**				Number of groups = **9**		
Time variable: **year**				Obs per group: min = **8**		
				avg = **14.8889**		
				Max = **17**		
Number of instruments = **120**						
				Wald chi2(4) = **1.63**		
Two-step results				Prob > chi2 = **0.8027**		
lnypp	Coef.	WC-Robust Std. Err.	z	P>[z]	[95% Conf.	Interval]
lnypp L1.	**.464033**	**2.947651**	**0.16**	**0.875**	**-5.313258**	**6.241324**
my	**.0013977**	**.0171021**	**0.08**	**0.935**	**-.0321218**	**.0349173**
lp	**.0222503**	**.1204972**	**0.18**	**0.854**	**-.2139199**	**.2584204**
i	**.0009585**	**.0049098**	**0.20**	**0.845**	**-.0086645**	**.0105816**
tse	**.0043302**	**.0530432**	**0.08**	**0.935**	**-.0996325**	**.1082929**
Instruments for first differences equation						
GMM-type: L(2/.).lnypp						
Standard: D.my D.lp D.i D.tse						
Instruments for level equation						
GMM-type: LD. lnypp						

It can be noted that the instruments employed for this type of GMM are represented in the last part of the table. As was shown in the methodology, there are separate moment conditions for regression in difference and regression in levels. Moreover, it should also be kept in mind that such a system GMM is based on the stationarity assumption. However, as we have already tested LP and TSE panels have unit root problems. Because of the violation of the stationarity assumption, the estimators generated by the

current estimation do not appear to be BLUE. Furthermore, given the insignificant z-statistics, the coefficients are not statistically different from zero. Hence, due to the insignificancy and biasedness of the estimators, we again fail to give any approvable interpretation.

On the other hand, unlike above discussed GMM estimations, the one-step difference GMM generated statistically significant estimators, and the results of it are provided in the Table 5 given below:

Table 5: One-step difference GMM estimation results

Dynamic panel-data estimation, one-step difference GMM

Group variable: **cntr_id**		Number of obs =	**133**
Time variable: **year**		Number of groups =	**9**
Number of instruments = **35**		Obs per group: min =	**8**
Wald chi2(4) = **1117.98**		avg =	**14.78**
Prob > chi2 = **0.000**		Max =	**17**

lnypp	Coef.	Std. Err.	z	P>[z]	[95% Conf.	Interval]
my	**.0057595**	**.0010185**	**5.65**	**0.000**	**.0037632**	**.0077557**
lp	**.020213**	**.0032276**	**6.26**	**0.000**	**.0138871**	**.0265389**
i	**.0005199**	**.0002179**	**2.39**	**0.017**	**.0000929**	**.000947**
tse	**.0130588**	**.0010873**	**12.01**	**0.000**	**.0109278**	**.0151898**

Instruments for first differences equation
Standard
D. (lp i tse)
GMM-type (missing=0, separate instruments for each period unless collapsed)
L2.(lnypp my)

Arellano-Bond test for AR(1) in first differences: z = **0.92** Pr > z = **0.357**
Arellano-Bond test for AR(2) in first differences: z = **2.33** Pr > z = **0.020**

Sargan test of overid. restrictions: chi2(31) = **114.59** Prob > chi2 = **0.000**
(Not robust, but not weakened by many instruments.)

It can be seen that there is a first-order autocorrelation in the first difference, which is considered as the usual occasion. It can also be noted that according to the test we fail to reject the Null hypothesis which states there is no second-order autocorrelation, meaning that in first differences the error term is not second-order serially correlated. As a result, this increases the efficiency of the estimators. Moreover, the Sargan test of overidentifying restrictions also suggests that though not robust the model is not weakened by many instruments, meaning that the instruments used in the regression model are valid. This can also be identified by a comparison of the number of observations and the number of instruments employed, which is 133 and 35, respectively. This informs that though less, there were effective instruments inserted into the model relative to the observations. Another important feature of this GMM estimation is that all the coefficients are found to be statistically significant at 5%

significance level given the considerable z-statistics. Hence, taking into account all these positive properties of one-step difference GMM estimation, it can be concluded that the provided estimators in the regression output are unbiased and consistent.

Once we have achieved the estimators, now let's turn to the interpretations. As strong theoretical evidence established by many scholars and researchers state, the currently computed estimators also suggest that labor, physical, and human capital (investment growth and education, correspondingly) positively affect the economic growth. Specifically, the positive LP coefficient of 0.020213 implies that in those selected CIS countries during 1992-2010, when the labor participation rate increased by 1%, it caused a log of real GDP per capita to rise by more than 2% (Note that we multiply the coefficient by 100). It represents that there was an increasing returns to scale from labor to GDP. On the other hand, although the effect of investment growth on GDP does not seem to be high, it is still positive. Particularly, the coefficient of 0.0005199 indicates that an increase in investment growth by 1% led log of real GDP per capita to grow by about 0.05%. In contrast, the effect of education on growth seems to be relatively high. In specific, the TSE coefficient of 0.0130588 denotes that if tertiary school enrollment rose by 1%, it brought almost 1.32% increase in the log of real GDP per capita.

Singularly, it can be detected that money to income ratio is found to have a remarkable positive effect on growth. Its coefficient of 0.0057595 which is strongly significant implies that when money to income ratio rose by 1%, the log of real GDP per capita increased by approximately 0.58% which is a noteworthy effect. This finding means that based on the earlier made assumption, financial development has a positive and a decent impact on economic growth. Hence, turning to the most important part, the solutions suggest that the results of this current paper seem to be consistent with the findings of other researchers who were stressing the role of financial development in economic growth. In other words, the established relationship between financial development and economic growth in the chosen CIS countries during the period 1992 and 2010 has been following the 'supply-leading' notion.

CONCLUSIONS

The paper has allocated sections appropriately to Literature review, Methodology, and Results. During the discussion of both the theoretical and empirical literature, it became obvious that depending on the data and various methodologies researchers found different results and could reason their plausible explanations, for which none of the judgments were excludable. Namely, four different points of views were defended by the prominent scholars and investigators, such that:

- Financial development causes economic growth - ‘supply leading’ view
- Economic growth causes financial development - ‘demand-following’ view
- Bidirectional causality between the two - they cause each other
- No relationship between the two - they have no impact on each other

out of which the first - supply-leading view appeared to have a big number of proponents such as Levine, King, Rajan, Zingales, Demirguc-Kunt, Beck, Kar,

Pentecost, Yavuz, and many others. Among these researchers Ross Levine was the one who contributed substantial empirical work to the finance-led growth concept.

Hence, the current paper's methodology was developed building on the work by LLB (2000), with some dissimilarities. One of the distinctions was the data concerning the countries, years, and some of the variables. Specifically, LLB (2000) have employed difference and system GMM[6] with the data on 71 countries for the period of 1960-1995. In their model the dependent variable was logarithm of real GDP per capita, and selected financial development indicators were liquid liabilities, bank credit, and private credit[7]. As for other factors that affect growth, school attainment, initial income, inflation, openness to international trade, and political stability indicators were selected.

As specified by the empirical results, it can be concluded that in those selected CIS countries development in the financial systems such as favorable innovations, banking sector improvements, effectively operating markets, and so on have been enhancing the overall economic activity and production of goods and services in overall. Basing on this knowledge, one can decide that financial sector development can be one of the important tools to accelerate the economic growth in those CIS countries.

FINAL CHAPTER

Limitations

One of the noticeable limitations of the work is the non-inclusion of the other two CIS countries, particularly Uzbekistan and Turkmenistan. This was due to the non-availability of the data on broad money in local currency unit indicator, which had to be used for the calculation of money to income ratio. Otherwise, the results would be full for all CIS countries. Moreover, the two variables - LNYPP and M/Y were computed manually. In particular for LNYPP, the nominal GDP was divided by CPI for which the base year was 2000, and the result was divided by the working-age population, and finally the logarithm form was computed. As for M/Y, the broad money indicator was divided by nominal GDP and was multiplied by 100. Hence, these manual estimations might have caused overestimation or underestimation of the actual data, as a result, the computed estimators might have been different from the one achieved in the results. Furthermore, another limitation is the use of only one financial development indicator in the model. A positive effect from only one indicator to growth might not be enough to conclude that financial development positively and strongly influences economic growth.

Implications and recommendations for further research

I believe the results presented in the paper are important in the sense that there is a fact that encouraging and maintaining the financial sector development, in turn, can make an

[6] Note that one-step difference GMM was not introduced yet when they carried out the research.
[7] They generated three regression models for each financial development indicator separately.

appreciable contribution the economic growth. In particular, this may be essential for policy implications applicable to the discussed CIS and other developing countries.
It is recommended for any further research to improve on each of the limitations of the current paper discussed above. Along with one-step difference GMM, other estimation tools are also suggested to use such as Instrumental Variable (IV) regression, Two-Stage Least Squares (2SLS) for comparative purposes. Moreover, it is also suggested to implement sensitivity analysis to see how these results are sensitive to any small changes in either used instruments, variables, periods, etc. Additionally, the research area can be widened by taking into account poverty reduction, which is also an important concern of all times. That is, as the empirical evidence presented so far indicates that financial development promotes economic growth, it can also be tested whether such financial improvement can result in poverty reduction indirectly through economic growth, especially in the case of developing countries. Finally, once the data on many other indices becomes accessible there will be a strong fundament to improve on this specific research area for the next generation.

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